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Controlling Beaver Damage

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This NebGuide describes beaver biology and behavior and characterizes the types of damage caused by them. It suggests control methods and equipment and describes legal restrictions.

Biology, Behavior, and Reproduction

Beavers (*Castor canadensis*) are North America's largest rodent with adults ranging from 40 to 60 pounds (*Figure 1*). Beavers are industrious, curious, and social. At one time, demand for their valuable fur led to the exploration of North America and sadly, almost resulted in their extinction. But thanks to responsible wildlife management, beaver populations have rebounded to sustainable levels.

The physical characteristics of beavers, such as webbed feet, nostrils and ears that can close under water, membranes that cover the eyes under water, and a broad, flat, scaly tail, enable them to thrive in aquatic environments. They can remain submerged for up to 20 minutes by slowing their heart rates and using oxygen stored in their large livers. Beavers mark their territories by excreting a sweet, yet pungent musk from paired glands around their anus called "castors." Typically, beavers deposit castor on mounds of grass and mud found at the water's edge. Aside from the distinctive odor, newly established mounds will exhibit a reddish stain.

The large front incisors of beavers allow them to cut and girdle trees. These incisors continue to grow throughout the beaver's life and are continuously sharpened during gnawing activities. Beavers are nocturnal and often begin their activities shortly after sundown.

Beavers are vegetarians. They eat the inner bark of birch, cottonwood, willow, aspen, alder, maple, and dogwood trees that they store in underwater caches in preparation for the winter. These caches are composed of limbs and branches of up to 5 inches in diameter and are located by dams or dens for easy under-ice access. In the spring and summer, beaver diet switches to herbaceous vegetation including water lilies, corn, soybeans, wheat, carrots, potatoes, apples, clover, and alfalfa.

Beavers, who mate for life, breed during January with two to four young being born three to four months later. The young, called "kits," begin eating leafy material at about six weeks of age. They typically remain with their parents for two years. Upon arrival of the second year's young, parents drive out the 2-year-olds to establish territories of their own. Thus the mature beaver colony is composed of three generations of beavers. Most beavers are 4 years old or less but some can live up to eight years. The territorial nature of beavers means that they tend to stay in their chosen location. Beavers will



Figure 1. A rare occurrence of a beaver on land during midday. (Photo Credit: *Nebraskaland Magazine*, Nebraska Game and Park Commission).

emigrate from an area, however, if they determine that it lacks sufficient woody food.

Harvest by humans has the largest impact on beaver populations, but river otters, wolves, coyotes, bobcats, and large birds of prey occasionally kill beavers. Beavers warn the colony of danger by slapping the water with their flat tail before diving to safety.

Dams

Dams vary in size according to need, but can range from just a few feet to several hundred feet in length. Beavers prefer to build dams where the water flow becomes constricted and often find culverts, overflow pipes, and other human-made conduits particularly attractive. Damming activity results from beavers' innate drive to stop the sound of running water. The resultant impoundment can range in size from a few acres to dozens of acres. Beavers use a variety of materials to build their dams including tree limbs, typically using branches 2 to 4 inches in diameter, mud, and — to a lesser extent — rocks, plant stalks, and even trash (*Figure 2a*).

Although beavers can live in dome-shaped lodges built of limbs and mud placed in the middle of a pond (*Figure 2b*), Nebraska beavers typically dig their dens into the bank. Entrances are usually underwater with the floor inside several inches higher than the water level. Entrances may be exposed during periods of low water.

Occasionally, a slick surface on the bank is made as beavers slide into the water. Beavers also clear routes through vegetation that grows in shallow water (*Figure 3*). Sometimes beaver runways can be seen at the bottom of ponds and canals.

Signs of Beaver



Figure 2a. Beaver dam. (Photo Credit: Ronald Fryda)



Figure 2b. Beaver lodge. (Photo credit: Ronald Fryda)



Figure 3. A beaver trail. (Photo Credit: Ronald Fryda)

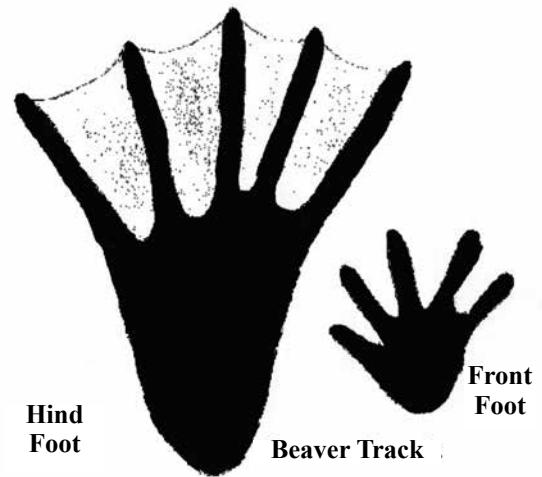


Figure 4. Beaver tracks. (Illustration by Kim A. Cabrera)



Figure 5. Young trees girdled by beavers. (Photo Credit: Dallas Virchow)

Beavers have large webbed hind feet and produce tracks up to six inches in length. A tail mark is sometimes produced in soft mud (*Figure 4*).

Damage Caused by Beaver

Beavers are one of the few animals capable of altering their environment to suit their needs. The flooding from beaver

dams can result in the inundation of large areas with deep standing water where once only shallow, slow-moving water existed. Plants and animals that are adapted to pond life and associated wetlands quickly establish themselves in the newly flooded area. The environmental benefits provided by beaver ponds and wetlands should be weighed against the damage before implementing any beaver control.

Girdling and felling trees

Beavers prefer to fell small trees from 2 to 6 inches in diameter but have been known to cut trees up to 3 feet in diameter. They can also harm even larger trees by stripping off the tree bark, in a process called “girdling.” Even if the beaver fails to girdle the trunk’s circumference completely, the damaged tree may still die or fail to thrive. (*Figure 5*).

Flooding crops, timber, and damaging structures

Depending on the location and size, beaver ponds can cause significant damage to human interests. Flooding can remove pastures and crops from production and drown stands of trees. One study estimated that flooding caused by beavers resulted in annual losses of \$22 million to the southeastern U.S. timber industry. Flooding may also threaten public safety by compromising the integrity of levees, dikes, roadways, bridges, and trestles through saturation of the soil with water. Dens can pose risks by undermining the integrity of a water-holding structure or collapsing under the weight of farm equipment.

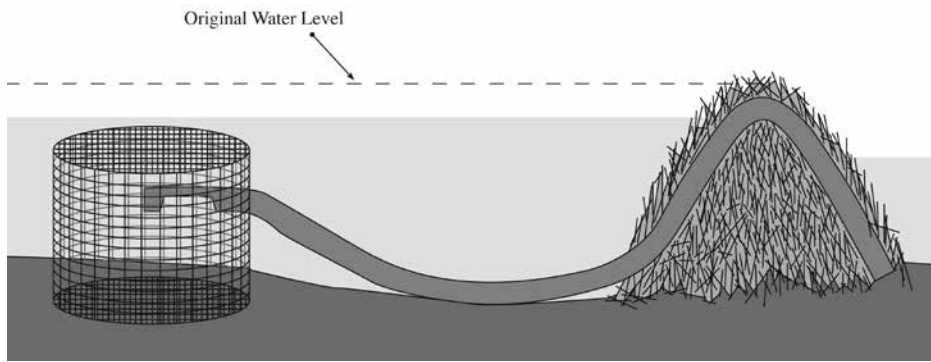


Figure 6. A beaver pipe pond leveler (Illustration by Jeffery R. Vaughn).

Control Strategies for Beaver

Beaver damage can be mitigated by: 1) installing beaver pipes to manage water levels and fencing to protect valuable crops and trees, and 2) removing a local beaver population and preventing recolonization.

Control Option #1 Beaver Pipes and Exclusion

Beaver pipes are designed to manage the flooding caused by beaver dams at a tolerable level. Typically, pipes consist of flexible corrugated plastic pipes inserted through the dam to allow water to flow (Figure 6). The upstream end of the pipe is protected with large wire mesh to keep beavers from plugging the pipe.

While an important tool, these devices have a number of limitations:

- First, they only protect trees from flooding, not from cutting.
- Second, pipes are effective only in areas that can tolerate some flooding (i.e. spring and heavy rains) and maintain at least 3 feet of water depth or a minimum of 18 inches of water under the ice. Pipes tend to fail in drainage ditches or flat canals. However, when used with fencing, they can be very effective in protecting culverts from beaver damming.

It is important to note that pipes and fencing are not maintenance-free. Inspect them in spring and fall to repair damage and remove floating debris that may have collected around the pipe or fencing. Publications detailing the proper use of beaver pipes and fences can be found at <http://icwdm.org>.

Exclusion

Protect ornamental trees and plants from beaver damage by placing hardware cloth, screens, metal flashing, plastic culvert, or drain tile around the plants. It is easy and inexpensive to protect a few individual plants. Exclusion is rarely practical for protecting acres of timber or treebelts.

Use of concrete spillways may reduce or prevent damage to dams caused by burrowing beavers. Rip-rap also can be used on earthen dams or levees. Electrical barriers, which produce an electrical field, have been effective in ditches and other narrow water channels. Electric fencing can stop beaver movement, provided that vegetation is properly controlled.

Repellents

Some individuals have reported that trees can be protected by painting a mixture of alkyd paints with clean, coarse sand on tree bark at a rate of 4 ounces of mason sand per quart of paint. Research performed in the state of Washington, however,

has challenged that claim. Castor placed on mounds may prevent beavers from becoming established in an area. This technique will only work if started and maintained before the newly evicted beavers reach the area.

Control Option #2. Lethal Beaver Control

Trapping is the most effective method of removing beaver from specific damage areas. Biologists with the Nebraska Game and Parks Commission monitor beaver populations and establish trapping regulations to ensure the viability of the species and the protection of public interests. Property owners are encouraged to have problem beavers controlled during the regular trapping season. Many beaver complaints would be resolved if more landowners allowed trappers to harvest beaver on their property. Nevertheless, even with trapping, the rapid reproduction rate of beavers, coupled with their ability to travel many miles to discover new territory, allow them to recolonize habitat where beavers have been removed. Therefore, it should not surprise landowners if beaver trapping is required annually.

A variety of traps are available for capturing beaver. Effective and safe trapping requires knowledge of the habits of beaver, habitat conditions, and presence of nontarget animals as well as knowledge of traps and lures. Anyone interested in learning how to use traps should contact the Nebraska Game and Parks Commission or visit <http://icwdm.org>.

Body grip kill traps

Traps, like the Conibear®, are designed to cause the quick and humane death of beavers (Figure 7). Body-grip traps are best used during the spring, summer, and fall. In Nebraska, traps having a jaw spread greater than 8 inches may be used only in underwater sets to catch beavers. Place body-grip traps in runways or at lodge entrances. Body-grip traps, when used correctly, present little risk to nontarget animals.

Foot-hold traps

Foot-hold traps are extremely versatile tools for the capture of beaver. They require more training than required for body-grip sets because one has to decide whether the front or rear foot is the target. Place footholds near, or in, active runways of beaver (Figure 8). Anchor footholds in water greater than 4 feet deep to ensure that the beaver drowns quickly. Use size #3 or larger footholds for trapping beaver.

Snares

Snares can be set to catch beavers' bodies. The snares consist of a cable formed into a loop with a locking device and a swivel to reduce cable twisting and breakage. Snares are typically placed in beaver runways or at the lodge entrance. If snaring before ice forms, be prepared to find a live beaver in the snare.

Cage and Clamshell Traps

Raccoon-size cage traps (10"x12"x32") and larger will capture beaver. Place them where beavers climb onto the land. Clamshell traps, such as Hancock®, and Bailey® traps, are specifically designed to capture beavers and have been used in reintroduction programs. They are effective, but each trap can cost over \$300. Additionally, their heavy metal frames and suitcase design make them cumbersome to carry to the set location. Training on the use of clamshell traps is available at <http://icwdm.org>.

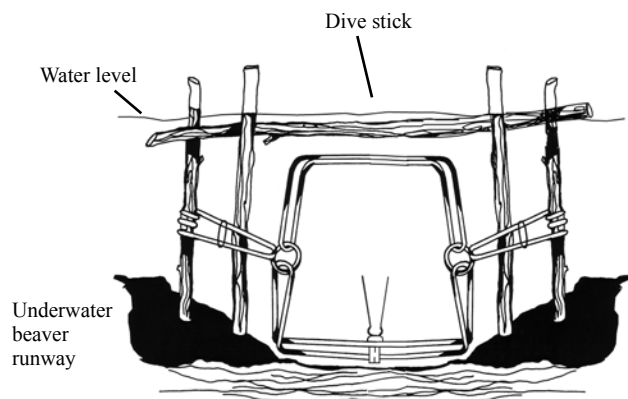


Figure 7. An underwater set of a body-grip trap (Illustration by Renee Lanik).

Spotlighting and Shooting

The Nebraska Game and Parks Commission requires a Beaver Damage Permit before any beavers are shot. Shooting and spotlighting are most effective when problem beaver are few in number and/or they have become trap-shy. Shooting may provide immediate relief from a problem but can be more time-consuming than trapping. Shooting is best left to trained professionals as beavers quickly learn from a shooter's mistakes.

Toxicants

No toxicants are registered for use on beaver in Nebraska.

Beaver Dam Breaching and Explosives Use

Remove beavers before breaching or removing beaver dams. Failure to remove beavers can disrupt their movements and needlessly hinder beaver control efforts.

Breaching is used to clear impediments to water flow. Dams located inside culverts are particularly dangerous and should only be breached by properly trained and equipped individuals. Unwanted beaver dams can be removed by hand with a rake or power tools (e.g. a winch or backhoe). Ideally the dam should be breached gradually over several days to reduce downstream flooding and erosion. Dam breaching is an inherently dangerous activity due to the risk of drowning by dam collapse. If possible, dams should not be disturbed during the winter to prevent negative impacts to wildlife in and around the waterway.

Farmers and road maintenance personnel who need water levels reduced rapidly should consult with USDA-Wildlife Services personnel about using explosives to remove the dam. Contact USDA-Wildlife Services at 402-434-2340.

Legal Status

Beavers are classified as furbearers and are thereby protected by the Nebraska Game and Park Commission. Information for current furbearer seasons and regulations is available from local Nebraska Game and Parks Commission offices or online at <http://www.ngpc.state.ne.us/>. In the off-season, a special depredation permit is required to remove problem beavers. Contact your local conservation officer or wildlife manager to obtain a permit. Call 402-471-5531 to obtain the number of the officer in your area. Dens can be disturbed only with a depredation permit. Property owners may legally breach beaver dams at any time. Translocation of beaver is not permitted in Nebraska.

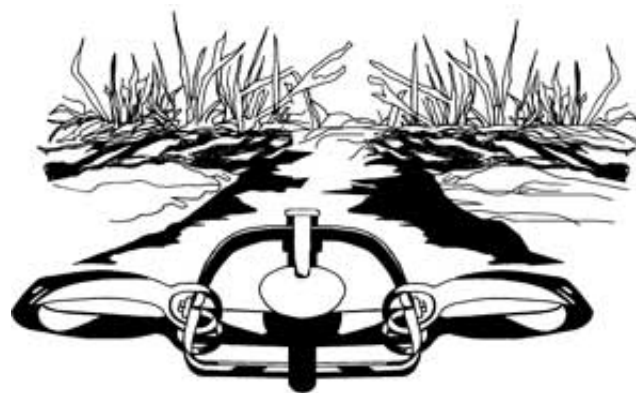


Figure 8. A foot-hold trap set underwater (Illustration by Renee Lanik).

Obtaining Assistance

USDA-Wildlife Services may be available for hands-on assistance in certain cooperating counties in Nebraska (402-434-2340). The Nebraska Game and Parks Commission maintains a list of private trappers who may be willing to do depredation work to limit or reduce local beaver colonies. Discuss your needs with the trapper prior to initiating any beaver control. Expectations should be made clear to prevent misunderstanding between the needs of the landowner and the abilities of the trapper. Use of unqualified trappers can result in additional time and effort to remove beaver that the first trapper missed.

Additional Sources of Information

The Internet Center for Wildlife Damage Management at <http://icwdm.org> has more data about beaver control.

Acknowledgements

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